

Address

Dipartimento di Informatica - Universit degli Studi di Torino
Corso Svizzera 185,
10149 Torino, Italy
Phone Number: +33 6 80 23 82 85
Email: michael.lienhardt@laposte.net

Personal Details

Birth Date: 19 Octobre 1982
Birth Place: Strasbourg, France
Citizenship: Franaise
Website: www.di.unito.it/~mlienhar

Current Situation

I am a post-doc in the HyVar European Project. My supervisor is Ferruccio Damiani, professor at the Torino University (Italy).

Summary of Research Work

Post-Doctoral Research: Delta-Oriented Programming

(01/06/2015 -): this position is part of the European project HyVar whose goal is to update over-the-air and custom embedded systems. My role in the project and extension and formal analysis [5,4,20] of the *Delta-Oriented Programming* paradigm, a modular way to build Software Product Lines in order to *automatically update* embedded programs. This project is carried out in collaboration with the companies Magneti Marelli, REPLY, Atbrox and the universities of Oslo, and Braunschweig.

Post-Doctoral Research: Deadlock and Resource Analysis

(21/11/2013 - 31/05/2015): this position was part of the Envisage European Project under the supervision of Cosimo Laneve, professor at the Bologna University (Italy). The goal of this project was the formal study of Service-Level Agreements (SLA) in the context of the Cloud in order to be able to construct cost predictions and to facilitate the construction of reactive systems guaranteeing compliance with SLAs. My work has been the definition and implementation of algorithms to statically detect interblocking [3,11] and calculate resource consumption in a competing program [7].

Post-Doctoral Research: Automatic computation and Deployment of a System in the Cloud

(01/09/2012 - 31/08/2013): this position was part of the the Aeolus ANR project, under the supervision of Roberto di Cosmo, professor at the Paris Diderot University (France). The purpose of this project was to offer a suite of formally proven tools to automatically deploy and re-deploy distributed and heterogeneous systems in a cloud. My work has led to the implementation of *Zephyrus* [22,9] tool, based on the component model defined in the project, which automatically computes, from an abstract specification given by a user, a complete system deployed on a cloud.

Post-Doctoral Research: Component Model

(01/07/2010 - 31/08/2012): this position was part of the HATS European Project, under the supervision of Davide Sangiorgi, professor at the Bologna University (Italy). The objective of this project was to define a modeling language allowing the precise description of aspects such as concurrency, modularity, security and resource consumption. The main objective of my work was the definition of a component model and its integration in the ABS language developed in the project [12,23,16]. I also collaborated with Dave Clarke on the definition of a type system verifying the validity of Delta-Oriented Software Product Lines [24,14].

PhD Thesis: Type systems and type inference in distributed calculi, with locations and passivations

(01/09/2006 - 30/06/2010): my PhD was supervised by Jean-Bernard Stefani (Directeur de Recherche at INRIA Rhne-Alpes) and Alan Schmitt (at the time, charg de recherche at l'INRIA Rhne-Alpes). The work consisted in two points: first, we defined a formal basis for software component models [19], based on the kell calculus (which encodes components using locations and code mobility using passivation) to which we added a mechanism for communication between distant localities and more refined synchronization primitives, like logical variables; second, we defined two type systems and a type inference algorithm on such a distributed calculus with code mobility [18,17]. The document is available here.

Teaching experiences

During my PhD thesis, I was an teacher assistant at the Joseph Fourier University in Grenoble, with 64 hours of lessons to teach per year. During a half semester, I organized the exercices and lab work of two groups of the course “introduction to programming” by Philippe Morat. This course, intended for the first year B.Sc. students in Physics and Chemistry, focused on the basis of object oriented programming and used the Java language as a support.

I taught a group of students in the course of Lydie du Bousquet, during two semi-semesters (2006-2007 and 2008-2009) and one semester (2007-2008). The aim of this course was to provide first year B.Sc. students in Chemistry-Biology with useful bases in office automation (using Microsoft Office Word), programming (with the study of the VisualBasic language in Microsoft Office Excel) and web sites (with an introduction to networks, and the study of HTML and Javascript). This course was structured in exercices and lab works where we worked on the notions seen during the lessons.

I also supervised a group of first year B.Sc. students in Math-Computer Science, in the course of Michel Burlet. I organized the exercices and lab work on the introduction to algorithms and imperative programming using as support the language C.

Education

- 2006 - 2010: PhD in Computer Science, entitled “*Composants et Typage*” at the Joseph Fourier University in Grenoble (France), in the LIG laboratory and defended in September 7th 2010. Examination Committee:
 - **President:** Emeritus Researcher Gerard Boudol, INRIA Sofia-Antipolis (France)
 - **Reviewer:** Professor Mario Coppo, Turin (Italy)
 - **Reviewer:** Professor Vasco Vasconcelos, Lisbon (Portugal)
 - **Examinator:** Professor Florence Maraninchi, Grenoble INP/ENSIMAG (France)
 - **Supervisor:** Senior Researcher Jean-Bernard Stefani, INRIA Rhne-Alpes (France)
 - **Co-Supervisor:** Researcher Alan Schmitt, INRIA Rhne-Alpes (France)
 - 2005 - 2006: one year stage at l’INRIA Rhne-Alpes on the study of type systems and component models. My supervisor was Alan Schmitt (researcher at INRIA Rhne-Alpes at the time).
 - 2004 - 2005: M.Sc. (research) in Computer Science at the Paris Diderot University (France)
 - 6 months stage at IRISA in Rennes (France) on the definition and implementation in C++ of an cognitif agent model. My supervisor was Stphane Donikian (Senior Researcher at IRISA)
 - 2004: won scholarship at ENS Cachan (France)
 - 2003 - 2004: M.Sc. 1st year (specialization in Computer science) at Poitiers University (France)
 - 3 months stage at the TU Wien of Vienna (Austria) on the implementation in Matlab of morphologic operations on surfaces in 3 dimensions. My supervisor was Allan Hanbury (Senior Researcher at TU Wien).
 - 2003 - 2004: M.Sc. 1st year at Poitiers University (specialization in Mathematics).
 - 2002 - 2003: B.Sc. 3rd year at Poitiers University (specialization in Computer science).
 - 2002 - 2003: B.Sc. 3rd year at Poitiers University (specialization in Mathematics).
 - 2000 - 2002: DEUG MIAS at Poitiers University
-

Administrative Responsibilities

I took part in the management of the HATS, Envisage and HyVar projects, organizing meetings between partners and participating in the writing and proofreading of deliverables.

In addition, I participate in the review of several international conferences, workshops and journals. The most recent are COORDINATION’16, FORTE’16, iFM’16, FMSPLE’16, ISoLA’16, Acta Informatica, JSS, SCICO.

Finally, I co-supervised several students and two PhD students (Jakub Zwolakowski and Abel Garcia).

Technical Skills

- **Programming Languages**

- Working knowledge of Java, Ocaml and C: I usually code my tools in these languages
- Good knowledge of C#, C++, scala, erlang, maude (rewriting logic interpreter): I don't usually code in these languages, but I can read them without problem
- Notions of Haskell, Lisp, Scheme

- **Implemented Tools**

- Static Resource Analyzer, written in Java
- Deadlock Analysis tool, written in Java
- Zephyrus, written in OCaml
- Interpreter of croll-pi, an extension of a reversible pi-calculus, written in maude

- **Languages**

- Fluent French, English and Italian
 - Basic German
-

Publication List

Journal Articles

- [1] **Dynamic Rebinding for Concurrent Object Groups: Theory and practice**
M. Bravetti, E. Giachino, M. Lienhardt and P. Y. H. Wong
in *The Journal of Logic and Algebraic Programming vol.86 n1*, pages 349–390 (2017)
- [2] **A framework for deadlock detection in core ABS**
E. Giachino, C. Laneve and M. Lienhardt
in *Software and System Modeling vol.15 n4*, pages 1013–1048 (2016)
- [3] **A framework for Deadlock Detection in coreABS**
E. Giachino, C. Laneve and M. Lienhardt, in *CoRR vol. abs/1511.04926*, pages 1–36

Conference Papers

- [4] **On Type Checking Delta-Oriented Product Lines**
F. Damiani and M. Lienhardt
in *12th International Conference on integrated Formal Methods (iFM), Reykjavik (Iceland), June 1-5 2016, LNCS vol.9681 n1*, pages 47–62
- [5] **Refactoring Delta-Oriented Product Lines to achieve Monotonicity**
F. Damiani and M. Lienhardt
in *7th International Workshop on Formal Methods and Analysis in Software Product Line Engineering (FM-SPLE), Eindhoven (The Netherlands), April 3 2016, EPTCS vol.206 n1*, pages 2–16
- [6] **On the Integration of Automatic Deployment into the ABS Modeling Language**
S. de Gouw, M. Lienhardt, J. Mauro, B. Nobakht and G. Zavattaro
in *Fourth European Conference on Service-Oriented and Cloud Computing (ESOCC), Taormina (Italy), September 15-17 2015, LNCS vol.9306 n1*, pages 49–64

- [7] **Static Analysis of Cloud Elasticity**
A. Garcia, C. Laneve and M. Lienhardt
in *17th International Symposium on Principles and Practice of Declarative Programming (PPDP), Siena (Italy), July 14-16 2015, Proceedings (ACM) pages 125–136*
- [8] **Automated synthesis and deployment of cloud applications**
R. Di Cosmo, M. Lienhardt, R. Treinen, S. Zacchiroli, J. Zwolakowski, A. Eiche and A. Agahi
in *29th IEEE/ACM International Conference on Automated Software Engineering (ASE), Vasteras (Sweden), September 15-19 2014, Proceedings (ACM) pages 211–222*
- [9] **Aeolus: Mastering the Complexity of Cloud Application Deployment**
M. Catan, R. Di Cosmo, A. Eiche, T. A. Lascu, M. Lienhardt, J. Mauro, R. Treinen, S. Zacchiroli, G. Zavattaro and J. Zwolakowski
in *European Conference on Service-Oriented and Cloud Computing (ESOCC), Málaga (Spain), September 11-13 2013, LNCS vol.8135 n1, pages 1–3*
- [10] **Concurrent Flexible Reversibility**
I. Lanese, M. Lienhardt, C. A. Mezzina, A. Schmitt and J.-B. Stefani
in *22nd European Symposium on Programming (ESOP), Rome (Italy), March 16-24 2013, LNCS vol.7792 n1, pages 370–390*
- [11] **Deadlock Analysis of Concurrent Objects: Theory and Practice**
E. Giachino, C. A. Grazia, C. Laneve, M. Lienhardt and P. Y. H. Wong
in *10th International Conference on integrated Formal Methods (iFM), Turku (Finland), June 10-14 2013, LNCS vol.7940 n1, pages 394–411*
- [12] **A Type System for Components**
O. Dardha, E. Giachino and M. Lienhardt
in *11th International Conference on Software Engineering and Formal Methods (SEFM), Madrid (Spain), September 25-27 2013, LNCS vol.8137 n1, pages 167–181*
- [13] **A Reversible Abstract Machine and Its Space Overhead**
M. Lienhardt, I. Lanese, C. Mezzina, and J.B. Stefani
in *Formal Methods for Open Object-Based Distributed Systems (FMOODS), Stockholm (Sweden), June 13-16 2012, LNCS vol.7273 n1, pages 1–17*
- [14] **Row Types for Delta-Oriented Programming**
M. Lienhardt, D. Clarke
in *Variability Modeling of Software-intensive Systems (VaMoS), Leipzig (Germany), January 25-27 2012, Proceedings (ACM) pages 121–128*
- [15] **HATS Abstract Behavioral Specification: The Architectural View**
R. Hhnle, M. Helvenstijn, E. B. Johnsen, M. Lienhardt, D. Sangiorgi, I. Schaefer and P. Wong
in *Formal Methods for Components and Objects (FMCO), Turin (Italy), October 3-5 2011, LNCS vol.7542 n1, pages 109–132*
- [16] **A Component Model for the ABS Language**
M. Lienhardt, I. Lanese, M. Bravetti, D. Sangiorgi, G. Zavattaro, Y. Welsch, J. Schfer, A. Poetzsch-Heffter
in *Formal Methods for Components and Objects (FMCO), Graz (Austria), November 29 - December 1 2010, LNCS vol.6957 n1, pages 165–183*
- [17] **Typing Component-Based Communication Systems**
M. Lienhardt, C. A. Mezzina, A. Schmitt, J.-B. Stefani
in *11th Formal Methods for Open Object-Based Distributed Systems and 29th Formal Techniques for Networked and Distributed Systems (FMOODS/FORTE), Lisboa (Portugal), June 9-12 2009, LNCS vol.5522 n1, pages 167–181*
- [18] **Typing communicating component assemblages**
M. Lienhardt, A. Schmitt, J.-B. Stefani
in *7th International Conference on Generative Programming and Component Engineering (GPCE), Nashville (USA), October 19-23 2008, Proceedings (ACM) pages 125–136*

- [19] **Oz/K: a kernel language for component-based open programming**
M. Lienhardt, A. Schmitt, J-B. Stefani
in *6th International Conference on Generative Programming and Component Engineering (GPCE)*, Salzburg (Austria), October 1-3 2007, *Proceedings (ACM)* pages 43–52

Invited Conference Papers

- [20] **Refactoring Delta-Oriented Product Lines to Enforce Guidelines for Efficient Type-Checking**
F. Damiani and M. Lienhardt
in *7th International Symposium On Leveraging Applications (ISoLA)*, Corfu (Greece), October 10-14 2016, *LNCS vol.9953 n2*, pages 579–596
- [21] **Automatic Application Deployment in the Cloud: from Practice to Theory and Back**
R. Di Cosmo, M. Lienhardt, J. Mauro, S. Zacchiroli, G. Zavattaro and J. Zwolakowski
in *26th International Conference on Concurrency Theory (CONCUR)*, Madrid (Spain), September 1-4 2015, *LIPICs vol.42 n1*, pages 1–16
- [22] **Fault Model Design Space for Cooperative Concurrency**
I. Lanese, M. Lienhardt, M. Bravetti, E. B. Johnsen, R. Schlatte, V. Stolz, G. Zavattaro
in *6th International Symposium On Leveraging Applications (ISoLA)*, Corfu (Greece), October 8-11 2014, *LNCS vol.8803 n1*, pages 22–36
- [23] **A Object Group-Based Component Model**
M. Lienhardt, M. Bravetti and D. Sangiorgi
in *5th International Symposium On Leveraging Applications (ISoLA)*, Heraklion (Greece), October 15-18 2012, *LNCS vol.7609 n1*, pages 64–78
- [24] **Conflict Detection in Delta-Oriented Programming**
M. Lienhardt and D. Clarke
in *5th International Symposium On Leveraging Applications (ISoLA)*, Heraklion (Greece), October 15-18 2012, *LNCS vol.7609 n1*, pages 178–192

Reports

- [25] **Optimal Provisioning in the Cloud Proofs**
R. Di Cosmo, M. Lienhardt, R. Treinen, S. Zacchiroli and J. Zwolakowski
in *technical report of Universit Paris Diderot (HAL)*, pages 1–30
- [26] **Composants et Typage**
M. Lienhardt
in *Joseph Fourier University, Grenoble (France)(now merged in Grenoble Alpes University)*, defended September 7 2010, pages 1–207
- [27] **Oz/K: A Kernel Language for Component-Based Distributed Programming**
M. Lienhardt, A. Schmitt and J.-B. Stefani
in *technical report of INRIA (HAL)*, pages 1–79